IN THE CLAIMS

Please amend the claims as indicated below:

1. (Currently amended) A method for processing a received signal, said method comprising the steps of:

precomputing branch metrics using said received signal for speculative sequences of one or more channel symbols;

storing said precomputed branch metrics in at least one pipeline register;

selecting one of said precomputed branch metrics from one of said at least one pipeline register based on at least one ~~decision~~ survivor symbol from ~~at least one~~ a corresponding state; and

selecting a path having a best path metric for a given state.

2. (Previously Presented) The method of claim 1, wherein said precomputed branch metrics is given by:

$$\tilde{\lambda}_n(z_n, a_n, \tilde{\alpha}) = (z_n - a_n + \tilde{u}(\tilde{\alpha}))^2,$$

wherein an intersymbol interference estimate is obtained by evaluating the following equation:

$$\tilde{u}(\tilde{\alpha}) = -\sum_{i=1}^{L} f_i \tilde{a}_{n-i}$$

and wherein z_n is the detector input at time instant n, L is a channel memory length, $\{f_i\}$, $i \in \{0,..,L\}$ are coefficients of the equivalent discrete-time channel impulse response, a_n is a channel symbol, and $\tilde{\alpha} = (\tilde{a}_{n-L}, \ldots, \tilde{a}_{n-1})$ is a sequence of channel symbols.

3. (Original) The method of claim 1, wherein said path metric is an accumulation of said corresponding branch metrics over time.

4. (Previously Presented) The method of claim 1, wherein an appropriate branch metrics $\lambda_n(z_n, a_n, \rho_n)$ is selected from said precomputed branch metrics $\tilde{\lambda}_n(z_n, a_n, \tilde{\alpha})$ using the survivor path $\hat{\alpha}_n(\rho_n)$:

$$\lambda_n(z_n, a_n, \rho_n) = sel\{\Lambda_n(z_n, a_n, \rho_n), \hat{\alpha}_n(\rho_n)\},$$

wherein $\Lambda_n(z_n, a_n, \rho_n)$ is a vector containing the branch metrics $\tilde{\lambda}_n(z_n, a_n, \tilde{\alpha})$, which can occur for a transition from state ρ_n and which correspond to channel symbol a_n, but different channel sequences $\tilde{\alpha}$, and wherein $\hat{\alpha}_n(\rho_n)$ is the survivor sequence leading to state ρ_n.

5. (Original) The method of claim 1, wherein said best path metric is a minimum or maximum path metric.

6. (Previously Presented) The method of claim 1, wherein said processing of said signal is performed using a reduced state sequence estimation technique.

7. (Previously Presented) The method according to claim 1, wherein said processing of said signal is performed using a delayed decision-feedback sequence estimation technique.

8. (Previously Presented) The method according to claim 1, wherein said processing of said signal is performed using a parallel decision-feedback equalization technique.

9. (Previously Presented) The method of claim 1, wherein said processing of said signal is performed using an implementation of the Viterbi algorithm.

10. (Previously Presented) The method of claim 1, wherein said processing of said signal is performed using an implementation of the M algorithm.

11. (Cancelled).

12. (Cancelled).

13. (Currently amended) A method for processing a <u>received</u> multi-dimensional signal, said method comprising the steps of:

precomputing one-dimensional branch metrics for each dimension of the <u>received</u> multi-dimensional signal for speculative sequences of one or more channel symbols;

storing said precomputed one-dimensional branch metrics in at least one pipeline register;

selecting one of said precomputed one-dimensional branch metric from one of said at least one pipeline register based on at least one ~~decision~~ survivor symbol from ~~at least one~~ a corresponding state; and

combining said selected one-dimensional branch metrics to obtain a multi-dimensional branch metric.

14. (Previously Presented) The method of claim 13, wherein said one-dimensional branch metric in the dimension j is precomputed by evaluating the following expressions:

$$\tilde{\lambda}_{n,j}(z_{n,j}, a_{n,j}, \tilde{\alpha}_j) = (z_{n,j} - a_{n,j} + \tilde{u}_j(\tilde{\alpha}_j))^2 \text{ and } \tilde{u}_j(\tilde{\alpha}_j) = -\sum_{i=1}^{L} f_{i,j}\tilde{a}_{n-i,j},$$

wherein $z_{n,j}$ is the detector input, $a_{n,j}$ is channel symbol at time n and $\tilde{\alpha}_j = (\tilde{a}_{n-L,j},..,\tilde{a}_{n-1,j})$ is a sequence of channel symbols in dimension j, L is a channel memory length, B is the number of dimensions, and $\{f_{i,j}\}$, $i \in \{0,..,L\}$, $j \in \{1..,B\}$ are coefficients of the equivalent discrete-time channel impulse response.

15. (Previously Presented) The method of claim 13, wherein said selection of an appropriate one-dimensional branch metrics is given by:

$$\lambda_{n,j}(z_{n,j}, a_{n,j}, \rho_n) = sel\{\Lambda_{n,j}(z_{n,j}, a_{n,j}), \hat{\alpha}_{n,j}(\rho_n)\},$$

wherein $\Lambda_{n,j}(z_{n,j}, a_{n,j})$ is the vector containing possible one-dimensional branch metrics $\tilde{\lambda}_{n,j}(z_{n,j}, a_{n,j}, \tilde{\alpha}_j)$ for the same channel symbol $a_{n,j}$, but different channel symbol sequences $\tilde{\alpha}_j$ and $\hat{a}_{n,j}(\rho_n)$ is the survivor sequence in dimension j leading to state ρ_n.

16. (Cancelled).

17. (Cancelled).

18. (Currently amended) A method for processing a received multi-dimensional signal, said method comprising the steps of:

precomputing one-dimensional branch metrics for each dimension of the received multi-dimensional signal for speculative sequences of one or more channel symbols;

combining said one-dimensional branch metrics into at least two-dimensional branch metrics;

storing said combined at least two-dimensional branch metrics in at least one pipeline register; and

selecting one of said at least two-dimensional branch metrics from one of said at least one pipeline register based on at least one ~~decision~~ survivor symbol from ~~at least one~~ a corresponding state.

19. (Previously Presented) The method of claim 18, wherein said one-dimensional branch metric in the dimension j is precomputed by evaluating the following expressions:

$$\tilde{\lambda}_{n,j}\left(z_{n,j}, a_{n,j}, \tilde{\alpha}_j\right) = \left(z_{n,j} - a_{n,j} + \tilde{u}_j\left(\tilde{\alpha}_j\right)\right)^2 \text{ and } \tilde{u}_j\left(\tilde{\alpha}_j\right) = -\sum_{i=1}^{L} f_{i,j}\tilde{a}_{n-i,j}\ ,$$

wherein $z_{n,j}$ is the detector input, $a_{n,j}$ is channel symbol at time n and $\tilde{\alpha}_j = \left(\tilde{a}_{n-L,j}, .., \tilde{a}_{n-1,j}\right)$ is a sequence of channel symbols in dimension j, L is a channel memory length, B is the number of dimensions, and $\{f_{i,j}\}$, $i \in \{0,..,L\}$, $j \in \{1..,B\}$ are coefficients of the equivalent discrete-time channel impulse response.

20. (Previously Presented)The method of claim 18, wherein said selection of an appropriate at least two-dimensional branch metrics corresponding to a particular state and channel symbol is based on the survivor symbols for said state and said at least two dimensions and said selection is performed among said precomputed at least two-dimensional branch metrics for said state, channel symbol and different previous channel symbol sequences.

21. (Cancelled).

22. (Cancelled).

23. (Original) The method of claim 18, further comprising the step of combining said selected at least two-dimensional branch metric to obtain a multi-dimensional branch metric.

24. (Currently amended) A method for processing a received signal received from a channel, said method comprising the steps of:

prefiltering said received signal to shorten a memory of said channel;

precomputing branch metrics using said received signal for speculative sequences of symbols that correspond to said shortened channel memory;

storing said precomputed branch metrics in at least one pipeline register;

selecting one of said precomputed branch metrics from one of said at least one pipeline register based on at least one ~~decision~~ survivor symbol from ~~at least one~~ a corresponding state; and

selecting a path having a best path metric for a given state.

25. (Previously presented) The method of claim 24, wherein said prefiltering step further comprises the step of processing ISI associated with less significant coefficients of said channel impulse response with a lower complexity cancellation algorithm using tentative decisions and said steps of precomputing branch metrics, selecting one of said branch metrics and selecting a path implement a reduced complexity sequence estimation technique to process ISI associated with more significant coefficients of said channel impulse response.

26. (Previously Presented) The method according to claim 25, wherein said lower complexity cancellation algorithm is a decision feedback prefilter technique.

27. (Previously Presented) The method according to claim 25, wherein said lower complexity cancellation algorithm utilizes a linear equalizer technique.

28. (Cancelled).

29. (Previously Presented) The method according to claim 25, wherein said lower complexity cancellation algorithm reduces the intersymbol interference associated with said less significant taps.

30. (Previously presented) The method according to claim 25, wherein said more significant coefficients comprise coefficients below a coefficient number, U, where U is a prescribed number less than L.

31. (Previously presented) The method according to claim 25, wherein said reduced complexity sequence estimation technique is performed using a decision-feedback sequence estimation technique.

32. (Previously presented) The method according to claim 25, wherein said reduced complexity sequence estimation technique is performed using a parallel decision-feedback equalization technique.

33. (Previously presented) The method according to claim 25, wherein said reduced complexity sequence estimation technique is performed using a reduced state sequence estimation technique.

34. (Previously presented) The method according to claim 25, wherein said reduced complexity sequence estimation technique is performed using an implementation of the Viterbi algorithm.

35. (Previously presented) The method according to claim 25, wherein said reduced complexity sequence estimation technique is performed using an implementation of the M algorithm.

36. (Cancelled).

37. (Cancelled).

38. (Currently amended) A method for processing a received signal received from a channel, said method comprising the steps of:

prefiltering said received signal to shorten a memory of said channel;

precomputing a one-dimensional branch metric using said received signal for speculative sequences of channel symbols for said shortened channel memory and for each dimension of the multi-dimensional signal;

combining said one-dimensional branch metric into at least two-dimensional branch metrics;

storing said combined at least two-dimensional branch metrics in at least one pipeline register; and

selecting one of said at least two-dimensional branch metrics from one of said at least one pipeline register based on at least one ~~decision~~ survivor symbol from ~~at least one~~ a corresponding state.

39. (Cancelled)

40. (Cancelled)

41. (Cancelled)

42. (Cancelled)

43. (Cancelled)

44. (Cancelled)

45. (Cancelled)

46. (Cancelled)

47. (Currently amended) A signal processor for processing a received signal, comprising:

a branch metrics unit for precomputing branch metrics using said received signal for speculative sequences of one or more channel symbols;

at least one pipeline register for storing said precomputed branch metrics;

a multiplexer for selecting one of said precomputed branch metrics from one of said at least one pipeline register based on at least one ~~decision~~ survivor symbol from ~~at least one~~ a corresponding state; and

an add-compare-select unit for selecting a path having a best path metric for a given state.

48. (Previously Presented) The signal processor of claim 47, wherein said decision from a corresponding state is taken from the survivor memory unit.

49. (Cancelled).

50. (Currently amended) A signal processor for processing a received multi-dimensional signal:

a branch metrics unit for precomputing one-dimensional branch metrics for each dimension of the received multi-dimensional trellis code for speculative sequences of one or more channel symbols;

at least one pipeline register for storing said precomputed one-dimensional branch metrics;

a multiplexer for selecting one of said precomputed one-dimensional branch metric from one of said at least one pipeline register based on at least one ~~decision~~ survivor symbol from ~~at least one~~ a corresponding state; and

a multi-dimensional branch metric computation unit for computing a multi-dimensional branch metric based on said selected one-dimensional branch metrics.

51. (Previously Presented) The signal processor of claim 50, wherein said decision from a corresponding state is available in the survivor memory unit.

52. (Cancelled).

53. (Currently amended) A signal processor for processing a received multi-dimensional signal, comprising:

a branch metrics unit for precomputing one-dimensional branch metrics for each dimension of the received multi-dimensional signal for speculative sequences of one or more channel symbols;

means for combining said one-dimensional branch metric into at least two-dimensional branch metrics;

at least one pipeline register for storing said combined at least two-dimensional branch metrics;

a multiplexer for selecting one of said at least two-dimensional branch metrics from one of said at least one pipeline register based on at least one ~~decision~~ survivor symbol from ~~at least one~~ a corresponding state; and

a multi-dimensional branch metric unit for combining said selected at least two-dimensional branch metric to obtain a multi-dimensional branch metric.

54. (Currently amended) The signal processor of claim 53, wherein said ~~decision~~ survivor symbol from a corresponding state is based on a survivor symbol in a corresponding survivor path cell.

55. (Cancelled).

56. (Currently amended) A signal processor for processing a signal received from a channel, comprising:

a prefilter to shorten a memory of said channel;

a branch metrics unit for precomputing branch metrics using said received signal for speculative sequences of one or more channel symbols for said shortened channel memory;

at least one pipeline register for storing said precomputed branch metrics;

a multiplexer for selecting one of said precomputed branch metrics from one of said at least one pipeline register based on at least one ~~decision~~ survivor symbol from ~~at least one~~ a corresponding state; and

an add-compare-select unit for selecting a path having a best path metric for a given state.

57. (Currently amended) The signal processor of claim 56, wherein said ~~decision~~ survivor symbol from a corresponding state is based on a survivor symbol in the survivor memory unit.

58. (Cancelled).

59. (Currently amended) A signal processor for processing a received multi-dimensional signal received from channel, comprising:

a prefilter to shorten a memory of said channel;

a branch metrics unit for precomputing one-dimensional branch metrics for speculative sequences of one or more channel symbols for said shortened channel memory and for each dimension of the multi-dimensional signal;

means for combining said one-dimensional branch metric into at least two-dimensional branch metrics;

at least one pipeline register for storing said combined at least two-dimensional branch metrics; and

a multiplexer for selecting one of said at least two-dimensional branch metrics from one of said at least one pipeline register based on at least one ~~decision~~ survivor symbol from ~~at least one~~ a corresponding state.